

Name: \_\_\_\_\_

This review sheet is not comprehensive! Be sure to study your notes and homework assignments as well!!

- 1) What is the fourth term of the sequence defined by the formula  $t_1 = 2a$ ,  $t_2 = 3a - 1$ , and  $t_n = 2t_{n-1} - 3t_{n-2} + 1$  when  $n \geq 3$ ?  
 A)  $-5a + 4$                       B)  $-1$                       C)  $-9a + 2$                       D)  $21a - 13$
- 2) What is the third term of the sequence defined by  $t_1 = \frac{1}{3}$  and  $t_n = 3t_{n-1} + 1$  when  $n > 1$ ?  
 A) 9                      B) 7                      C) 11                      D) 5
- 3) What are the first three terms in the sequence whose general term is  $t_n = \frac{2n}{n+1}$ ?  
 A)  $1, \frac{1}{2}, \frac{1}{3}$                       B)  $\frac{4}{3}, \frac{5}{4}, \frac{6}{5}$                       C)  $1, \frac{4}{3}, \frac{3}{2}$                       D)  $0, 1, \frac{4}{3}$
- 4) Find the fifth term of the sequence  $-3, 6, -12, \dots$   
 A) 48                      B) -24                      C) 24                      D) -48
- 5) Determine the first three terms of the following sequence(s) given the recursive rule:  
 $h_1 = 1$  and  $h_n = h_{n-1} + 2n - 1$
- 6) Find the first five terms of the sequence defined recursively as follows:  $t_1 = 1$ ,  $t_n = 3t_{n-1}$ ,  $n \neq 1$ ,  $n$  is a natural number
- 7) The sequence  $1, -3, 9, -27$  is *best* described as  
 A) neither arithmetic nor geometric                      C) both arithmetic and geometric  
 B) arithmetic                      D) geometric
- 8) Which of the following sequences is geometric?  
 A) 2, 3, 4, 5                      B) 1, 2, 4, 8                      C) 2, 4, 8, 12                      D) 2, 3, 5, 7
- 9) What is the common difference in the arithmetic sequence  $1, 1.25, 1.5, 1.75, \dots$ ?  
 A) 0.25                      B) 0.5                      C) -0.5                      D) -0.25
- 10) What is  $t_{16}$  of the sequence  $2, 11, 20, \dots$ ?  
 A) 140                      B) 137                      C) 128                      D) 119
- 11) Find the  $n$ th term of the arithmetic sequence  $-1, 2, 5, \dots$ ?  
 A)  $2n + 2$                       B)  $3n - 2$                       C)  $3n - 4$                       D)  $-2n + 1$

$$1) t_n = 2(t_{n-1}) - 3(t_{n-2}) + 1$$

$$t_1 = 2a$$

$$t_2 = 3a - 1$$

$$t_3 = 2(\overbrace{3a-1}^{t_2}) - 3(\overbrace{2a}^{t_1}) + 1$$

$$t_4 = 2(-1) - 3(3a-1) + 1 = -2 - 9a + 3 + 1 = -9a + 2 \quad \boxed{C}$$

$$2) t_1 = \frac{1}{3} \quad t_n = 3(t_{n-1}) + 1$$

$$t_2 = 3\left(\frac{1}{3}\right) + 1 = 2$$

$$t_3 = 3(2) + 1 = \boxed{7} \quad \textcircled{B}$$

$$3) t_n = \frac{2n}{n+1}$$

$$t_1 = \frac{2(1)}{(1)+1} = \frac{2}{2} = 1$$

$$t_2 = \frac{2(2)}{(2)+1} = \frac{4}{3}$$

$$1, \frac{4}{3}, \frac{3}{2} \quad \textcircled{C}$$

$$t_3 = \frac{2(3)}{(3)+1} = \frac{6}{4} = \frac{3}{2}$$

$$4) -3, 6, -12$$

↑  
times -2

What kind of  
sequence?

Geometric

$$a_n = a_1(r)^{n-1}$$

$$a_5 = (-3)(-2)^{5-1}$$

$$a_5 = -3(-2)^4$$

$$a_5 = \boxed{-48} \quad \textcircled{D}$$

$$5) h_n = h_{n-1} + 2n - 1$$

$$h_1 = 1$$

$$h_2 = 1 + 2(2) - 1 = 4$$

$$\boxed{1, 4, 9}$$

$$h_3 = 1 + 2(3) - 1 = 6$$

$$6) t_n = 3t_{n-1}$$

$$t_1 = 1$$

$$t_2 = 3(1) = 3$$

$$t_3 = 3(3) = 9$$

$$t_4 = 3(9) = 27$$

$$t_5 = 3(27) = 81$$

$$1, 3, 9, 27, 81$$

$$7) 1, -3, 9, -27 \quad (D)$$

$$-3 - 1 = -4$$

$$9 - -3 = 12 \quad \text{Not same, Not arithmetic}$$

$$\frac{-3}{1} = -3 \quad \frac{-27}{9} = -3$$

$$\frac{9}{-3} = -3$$

Geometric

8) (B) Multiplying by 2 every time.

9) Common difference (subtract back)  
 $1.25 - 1 = .25 \quad (A)$

10) Adding 9 every time (Arithmetic)

$$a_1 = 2$$

$$d = 9$$

$$n = 16$$

$$a_n = a_1 + d(n-1)$$

$$t_{16} = 2 + 9(16-1)$$

$$t_{16} = 2 + 9(15)$$

$$t_{16} = 2 + 135 = 137 \quad (B)$$

11)  $-1, 2, 5$  Adding 3 every time

$$a_1 = -1$$

$$d = 3$$

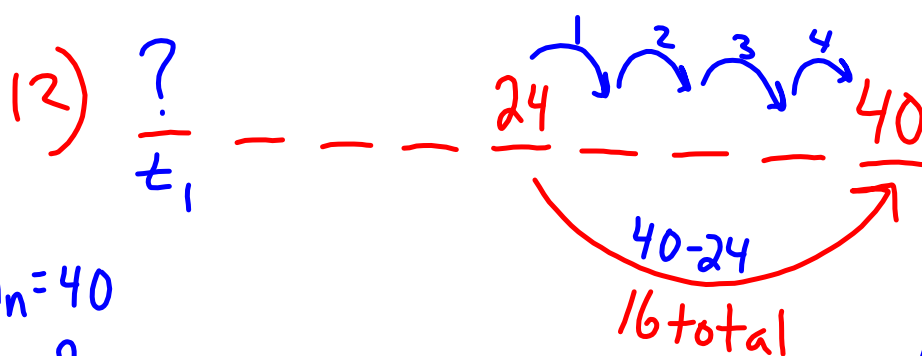
$$a_n = -1 + 3(n-1)$$

$$= -1 + 3n - 3$$

$$(C) = 3n - 4$$

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- 12) What is  $t_1$  of the arithmetic sequence for which  $t_5 = 24$  and  $t_9 = 40$ ?  
 A) 6                      B) 2                      C) 8                      D) 4
- 13) The common ratio for the geometric sequence  $6, -2, \frac{2}{3}, \dots$  is  
 A) 1                      B)  $\frac{1}{3}$                       C) -3                      D)  $-\frac{1}{3}$
- 14) What is  $t_{11}$  for the geometric sequence  $3, 072, -1, 536, 768, -384, \dots$ ?  
 A) 3                      B) 6                      C) 0.5                      D) 12
- 15) What is  $t_1$  for the geometric sequence for which  $t_8 = -3, 584$  and  $t_3 = 112$ ?  
 A) 2                      B) 28                      C) -2                      D) -28



$$a_n = 40$$

$$n = 9$$

$$d = 4$$

$$40 = a_1 + 4(9-1)$$

$$40 = a_1 + 4(8)$$

$$40 = a_1 + 32$$

$$\begin{array}{r} 40 \\ - 32 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ - 32 \\ \hline 8 = a_1 \end{array}$$

(C)

$$\frac{16}{4} = 4 = d$$

13)  $6, -2, \frac{2}{3}$

Common Ratio:  
divide backwards

$$\frac{-2}{6} = -\frac{1}{3}$$

$$\frac{\frac{2}{3}}{-2} = -\frac{1}{3} \quad \textcircled{D}$$

14) Geometric:  $a_n = a_1(r)^{n-1}$

$$a_1 = 3072$$

$$r = \frac{-1536}{3072} = -\frac{1}{2}$$

$$a_{11} = 3072 \left(-\frac{1}{2}\right)^{11-1}$$

$$n = 11$$

$$a_{11} = 3 \quad \textcircled{A}$$

15)  $? \quad \frac{112}{t_3} \quad \frac{-3584}{\text{Total}}$

Need to find  $r$

$$\frac{-3584}{112} = -32$$

$$t_3 = 112 \quad 112 = a_1(-2)^2$$

$$r = -2$$

$$a_1 = 28$$

$$r = \sqrt[5]{-32}$$

$$r = -2$$

$$\frac{112}{-2} = -56 \quad \frac{-56}{-2} = \textcircled{28} \quad \textcircled{B}$$